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Domestication of information and communication technologies in an energy perspective

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Introduction

Information and communication technology (ICT) increasingly permeates everyday life in industrialized societies. Computer, internet, mobile phones and many other related technologies have become standard devices that most people take for granted. These changes have implications for the energy consumption of societies. Households see their electricity consumption increase, energy is required for the production of the equipment for households, and the running of the infrastructure needed for the internet and mobile telephony demands energy. ICTs also promise to save energy, for instance, by contributing to more energy efficient production processes and by saving transport when tasks can be carried out from home. In this paper we intend to highlight some of the energy implications of ICTs from the perspective of the households (the implications related to the particular use of ICT for planned energy savings in households are left to another paper in the project of which this paper is a part). Obviously, even a thorough treatment of this topic would only be part of the puzzle regarding the overall energy implications of ICT, but it is an important part that has attracted less attention than the energy implications related to production processes.

Previous processes of domestication of new technologies in everyday life have implied increasing energy consumption. The classic example is the construction of the car-based society where changes in the patterns of settlement, shopping routines, leisure activities, and many other conditions involved longer travelling distances and higher fuel consumption. Another example is the electrification of households. Combined with the small electromotor and radio technology, electrification opened up an era where household tasks became mechanized and supported by convenience technologies, and where entertainment became available in mediated form, all implying a steady increase in electricity consumption. The domestication of ICTs can be seen as a new phase in the continuing electrification of everyday life where the computer and other devices combined with the new infrastructure of the internet open up new opportunities for communication, mediated entertainment, leisure activities, and support for household tasks.

Both the previous and the present processes of domestication are strongly supported by ideas of modernity and progress, and many actors are involved in removing barriers for the diffusion of the new technologies, while few consider the potential energy implications. We do not know enough about the historical processes to assess how strongly the concern for the related energy consumption was expressed before the 1970s, but we guess that the primary concern was to secure provision of sufficient and low priced electricity and petrol within the restrictions of economic resources for investment and the balance of payments. In the 1970s energy provision became a serious concern due to the oil crises, and in the 1980s the environmental aspects of energy consumption came high on the agenda. In spite of the increasing focus on energy issues, the interest in promoting the "information society" has not been curbed by concerns for increasing energy consumption. Two dominant social agendas tend to be kept separate: one is to make sure that society is not lacking behind in the competitive race for being an advanced information society; another is to take the first steps to prevent climate change. When the two agendas are brought together, it is often done in an optimistic way suggesting that ICT can help to save energy. Among the more problematic aspects, the issue of standby consumption has attracted attention, but with this exception, the integration of ICT in everyday life proceeds with little concern for the energy implications. New normal standards are developed, and like previous processes of domestication of new technologies, they can become very energy consuming if this concern is not integrated much more actively into the construction process.

The following two sections introduce briefly the theoretical approach of our study. The approach is inspired by the practice theoretical perspective, which we combine with ideas from domestication research in our study of the integration of ICT into everyday practices. The theoretical sections are followed by a short introduction to our empirical work (qualitative interviews). Then follows our empirical analysis, which is divided into two parts: The first shows the pervasiveness of the integration of new ICTs into everyday practices and elaborate on the direct and indirect energy impacts. The second part provides a detailed analysis of the integration of ICT into a specific everyday practice (the practice of "staying in touch" with friends and relatives) and discusses what kind of derived energy impacts that might follow from changes in this practice. The paper finishes with a few concluding remarks.

Theoretical approach: Domestication in a practice perspective

Studies on domestication of ICTs emerge from two different traditions: media studies and technology studies (Sørensen, 2006). Silverstone et al. (1989; 1992) introduced the domestication concept and the concept of the moral economy of the household when they studied how ICTs became integrated in family life. Their main research interests centred on the autonomy and identity of the family and of the individual members of the family. The technology studies approach to domestication focuses on the negotiated space between designers' script for a technology and users' interests, as well as the implications of this interplay for the construction of a wider everyday life. Domestication is seen as a multi-sited process that transcends the household space and involve the set-up of institutions and collective discourses (Sørensen 2006).

This paper shares ideas from these strands of domestication research and combines them with a practice theoretical approach that modifies the perspective slightly. Whereas technology studies usually have an artefact as the focal point and discuss the construction of a set of practices related to this artefact, the practice theoretical approach suggests to focus on a particular practice and to discuss the change over time in this practice, for instance, when practitioneers include new artefacts

in the performance of the practice (Shove and Pantzar, 2005; Shove et al., 2007). Practices can be seen as clusters of activities where the coordination and interdependence make it meaningful to describe them as entities (Schatzki, 2002). A practice is thus an integral bundle of activities that make sense to people as an entity, which is recognizable across time and space. The entity can only exist when the activities involved are carried out by people, and this enactment transforms the entity over time. When new technologies are introduced, they meet with and often have to be incorporated into pre-existing practices to survive – and both practices and technologies change in the process. Sometimes new technologies involve the introduction of a new practice, but this is a relatively seldom occurrence (for a review of practice theory as inspiration for environmental studies, see (Røpke, 2008); also, see Christensen and Røpke Forthcoming for a discussion on how practice theory can inspire studies on ICTs in everyday life).

The present phase of domestication of ICTs calls for the application of a practice theoretical perspective. When the home computer was first introduced, it made sense to discuss how it was domesticated as a particular object integrated in a few specific practices such as playing games and using word-processing. In the same way "surfing on the internet" made sense as a particular practice in the beginning. Since then, computer and internet have developed into a general infrastructure which can be used for so many different purposes that it is more reasonable to change the focus to various practices and consider how the new infrastructure is incorporated into these. New practices have also emerged in relation to the new infrastructure, but the integration of ICTs in almost all ordinary practices dominates the construction of the new normal standards in everyday life – standards with important implications for energy consumption.

Categories of energy impacts

When practices change over time, the related energy consumption is affected in various ways. In the following assessment of the energy impacts of ICT integration in everyday practices, we consider three types of effect that can all be either positive or negative (for elaboration of this brief outline, see (Røpke et al., Forthcoming) and (Willum, 2008)):

- The impact on direct energy consumption, usually electricity. Electricity consumption changes when practice changes involve the use of new types of equipment and eventually the discarding of old equipment. Sometimes practices that did not involve the use of electricity are electrified, and sometimes new devices are introduced as an "add on" to otherwise unchanged practices. In general, the electricity consumption depends on the energy efficiency of the equipment and the length of time it is used or left in standby mode. Some equipment is very energy-consuming such as plasma screens, projectors, and game computers, and some equipment must be turned on at all times, for instance, home servers, connections for IP-telephones, surveillance cameras, and set-top boxes that are updated continually. Simultaneously, ICTs offer a potential for direct energy-savings related to the management of lighting, heating, and washing machines.
- The impact on indirect energy consumption. Two types are included here (as we do not deal with the waste handling part of the life cycle):
    - Upstream energy use related to the production of the equipment used for the practice. This part of energy consumption is particularly relevant for devices with a short lifespan. Due to the rapid rate of renewal for much ICT equipment the economic life is often very short, particularly for small devices such as mobile phones. The indirect energy consumption is also increased by the use of specialized and diversified

devices instead of multi-purpose equipment, as specialization usually calls for a larger number of devices.
    - The energy used for the running of the ICT-related infrastructure such as sending masts and servers. This part of energy consumption attracts increasing attention, for instance, because of the interest in placing the large server parks of Google close to cheap energy provision. Also, the increasing bandwidth of internet connections opens for download and upload of larger amounts of data which requires more sending capacity.
- The derived energy impacts. Changes of a practice often influence other practices as well as the possibilities for consumption in other areas, and in this way wider impacts on energy consumption can occur. In particular, we consider the derived impacts related to
    - Economic resources. If practice changes are expensive, they absorb a larger part of the income and free less resources for other activities that may be energy consuming.
    - Time use. In the same way, a time-consuming activity may free less time for other activities. This can either reduce energy consumption if energy-consuming activities are given up, or increase energy consumption if the need for time-saving devices increases.
    - Transport. As transport is very energy consuming, derived impacts in this area are particularly relevant. These have also been the subject of several studies on the potential for energy savings related to teleshopping and teleworking.

Changes of practices codevelop with changes in systems of provision, production processes, transport systems and many other conditions that are decisive for the overall energy impacts of social life. Therefore, it should be emphasized that our discussion of the energy implications of practice changes in everyday life can only provide a part of the puzzle – however, an under-researched part.

Empirical basis: Interviews in Denmark

The present paper is based on a case study carried out in Denmark in 2007-8. Statistics show that Denmark belongs to the group of countries where ICTs have diffused widely, so it is a relevant place to study the emerging energy impacts. As the intention is to contribute to a proactive approach towards the potential negative energy impacts, we are interested in uncovering emerging trends rather than documenting the present energy consumption. The study is thus based on interviews with people whose use of ICTs may indicate the direction of ICT-applications in the near future. We have tried to find people who have long experience with the use of ICTs, and who have the competence to take up new applications. A few of them can be characterized as lead users in von Hippel's sense or as early adopters who are fascinated by new technologies and interested in playing with them, but most informants are just relatively heavy users with little or no fascination of the technology as such. Thus, they resemble the majority of the population and, at the same time, are a little ahead of the majority with regard to the use patterns.

Use patterns differ according to age, gender, education, and income. This is not only so because, for instance, the younger generations have grown up with ICT and thus find it easier to apply the technologies: differences are not only about competences, but also relate to different concerns and interests. To get a broad picture, we have included informants in age groups from the twenties to the seventies, men and women, with different educational background, different family situation and from different places in the country. After a first round of in-depth interviews with seven informants, we carried out short telephone interviews with 18 people in order to select informants,

who could elucidate additional use patterns in a second round of interviews. In-depth interviews of about two hours have been carried out with fourteen main informants in their homes, and in three cases, the partners of these informants took part in the interviews as well. In total, seventeen persons were interviewed in their home. In addition, 11 more people were interviewed only by phone, usually about fifteen minutes.

Before the in-depth interviews, informants were instructed to fill in two forms, one covering all the ICT equipment of the household (40 types of equipment were mentioned, and informants stated how many they had of each type), and the other covering the use of computer and internet in relation to a list of 48 activities organized in the following groups: communication, entertainment, information, purchase and sale, work at home, education, hobbies and volunteer work, administration and finances, domestic work and management of the dwelling, and finally health. Informants ticked off which applications they used each week, monthly, or more seldom. These forms served as a take-off for the semi-structured interviews that covered the everyday life of the families, the activities involving ICTs and changes in these activities over time, as well as the changes in equipment, internet and television connections over time. If energy concerns were not brought up by the informants themselves, the interviews concluded with direct questions on energy.

The pervasive integration of ICTs

The concept of ICT is relatively new, but the group of ICTs include old technologies such as the telephone, radio and television. Although the interpretive flexibility related to the old technologies was wide and the role of and meaning attached to the technologies changed over time, they tended to be integrated in practices defined by the technologies: phoning, listening to the radio and watching television. As mentioned above, the same could be said about practices related to the home computer and the internet at the time these technologies were first introduced, but presently they constitute a general infrastructure that can be integrated in a wide variety of practices. Few of these practices are "defined" by the use of computer and internet, but most practices are "redefined" through the integration process.

The most striking observation from our material is the pervasiveness of the integration of the new ICTs, computer, internet and mobile phone, in everyday practices. This may not be surprising, considering that ICTs support the generic activities of communication, search for information and shopping, which are integrated aspects of almost all practices in modern societies. Nevertheless, we were impressed by the degree and the ways in which our informants integrate ICTs in a variety of practices. In the following examples, we focus on some of the informants' leisure activities where, sometimes, not only the generic ICT-uses are integrated, but also more peculiar uses appear.

Several informants are active sportspeople, and some are involved in unpaid work as coaches and organizers. Mary is a coach in the local *karate* club where she trains a children's team once a week. She communicates with their parents through email and contributes with news and information about the team to the club's webpage. She also finds inspiration for her work as a coach by looking at the webpages of other karate clubs.

Tyge, his wife and one of their two children are active in *various sports*: running, playing badminton and practising step dance. Beyond the training, both parents are involved in coach meetings and take part in the committee of the local athletic association. Much communication in relation to the committee work is done by email, and almost daily Tyge receives mails with questions from members of the association; sometimes he responds while he is at work. He also

uses the webpage of the municipality to search information about how to apply for funds for the sports activities.

Esben is a member of a *rifle* club, and until recently he had much work as a treasurer for the club through a period of 6-7 years. He used the computer for the accounts and found it useful to have a laser printer which could print giro forms in the correct black colour. Esben has a safe for keeping weapons for the club, and he has installed a webcamera in the room with the safe. If anything moves in the room, a picture message is sent to Esben's mobile.

The informants (or their partners), who like to *run*, all have running computers – measuring the distance and gradients of the route and monitoring the speed and pulse of the user. Also, Esben and his wife use a running computer for their long walking tours, and Esben uploads the results to the computer on their return. Michael is not interested in using the running computer he received as a subscriber to a magazine, but he has used the magazine's net-based route map where it is possible to draw one's route and measure the length.

Merete takes lessons in *line dance*. When she cannot figure out the steps, she finds the dance on YouTube: Here are videos with people who instruct in the dances.

Lise rides her *horse* one and a half hour every day. Presently, the horse is stabled at the neighbouring farm while Lise and her husband renovate their stable. When it is finished, Lise intends to have two horses who can keep each other company. She plans to install a webcamera in the stable and to access the recordings through a website so she can keep an eye on the horses without having to go out during the night. She also considers to monitor the fold in the daytime so she can watch the horses while she is at work. Then, in case of bad weather, she could decide to go home earlier. Lise teaches others to ride twice a week. She would like to video-record her trainees because you can learn much from watching yourself riding. For this purpose she would like to replace her old video camera with a new digital one which records directly on a DVD. She would also like her husband to record herself riding – and she could record his running.

The renovation of the stable is part of a larger *do-it-yourself* project where Lise and her husband renovate their home, the main building and two wings of an old farm. Preparing the rebuilding of the main house, Lise used the programme Microsoft Visio to visualize both the front and the lay-out of house. The programme is designed to visualize projects, systems and processes in flow charts, for instance, but Lise found that it served well for her purpose, and the drawings were very useful as inputs for decision-making and for discussions with others. In relation to the rebuilding project, Lise finds net shopping very useful. For instance, they succeeded in finding old roofing tiles fitting with the ones they already had.

Singing in a *choir* is also a popular pastime among the informants (surely, statistically overrepresented in this material). The couple Merete and Michael participate in a choir for beginners, organized by the rythmic evening school. The choir has a Facebook group where the music is available so the members can practise at home. Facebook is also used for attempts to attract more men to the choir, flagging all the nice female members, and for social communication between the members. Merete uses YouTube to search for songs they plan to sing, to get an impression of how they sound in the original version.

With a basis in an association for elderly people, Brian took the initiative to establish a choir eight years ago. The choir practices once a week, and both Brian and his wife participate. Brian is responsible for the webpage of the choir which can be booked for concerts. He has also made the webpage for the choir in which one of his daughters sing.

Benny works with research in the history of music, and in his leisure time he composes and sings in a choir. He is a member of a small association of composers which has its own concert choir specialized in performing newly composed music, inspired by the vocal music style from the Renaissance. When the choir gives concerts, Benny records the music on a mini-disc, and later he edits the results on the computer, removing the applause. Sometimes he burns a CD with the sound file and discusses the result with the other composers. Benny is on the committee of the association where the members often use Skype's chat feature to communicate, and a few times they have had meetings over Skype, supported by webcameras.

For many years Brian was involved in *amateur theatre*, both as an actor and in other functions. Now he does not act any more, but he follows the local scene, and not so long ago he video-recorded their performance of a well-known musical. Brian knows the musical so well that it was easy for him to decide when to zoom in and out. He made four recordings of the whole musical and used them as a basis for editing one high quality version. The result was burned on DVDs and Brian sold around 100 copies.

Helle is interested in *genealogy*. Her interest was aroused when her cousin made a website where family members could upload information about their ancestors and develop a genealogical tree. Helle finds information for the website by searching in online databases and by interviewing her mother. The search is made easier these years as the church registers are scanned and made available on the internet. The website of Helle's cousin includes a page for every ancestor where it is possible to write about the person's childhood, schooling, working life and so on, and to upload photographs and film. The information is available for everybody.

The informants with schoolchildren are in contact with the *school* through the internet. Almost daily, Mary logs on to the internal pages of her daughter's class. Here she finds week plans for the class and the homework that is set for the pupils. Mary can also write messages to the teachers through the website and take part in a forum for debate.

The interview material could be the basis for filling many more pages with other examples of the integration of ICTs in various practices, from political grassroot activities to travel experiences. The examples illustrate that all kinds of public institutions, organisations, associations and interest groups have embraced the internet, and that our informants actively support this by using the facilities, sometimes very creatively. The political encouragement of the information society is visible, for instance, in the digitization of archives and in the communication systems used in schools. Many activities also involve the use of commercial products, additional to the computer, such as video recorders and running computers, commercial services such as Facebook and Picasa, and commercial software such as image editing programmes. The search for business opportunities in relation to the uptake of computer and internet results in a proliferation of supportive tools that interact with the practices in which they become integrated (e.g. work on digital photographs). Business innovation often involves a search for products or services where designers try to script specific uses, and of course, this also goes for much specific ICT equipment and software. However, the interpretive flexibility of computer and internet and – although to a lesser extent – of

the many related products and services is great and opens up a large potential for user creativity. Some of Lise's ideas, mentioned above, are illustrative; as she says: "I use my pc for everything I can possibly think of using it for".

The integration of ICTs does not proceed smoothly, as the examples above may indicate. On the contrary, nearly all informants mention problems, for instance, with compatibility. At the time of the interviews, the diffusion of Windows Vista created many problems and frustrations. For instance, Merete and Michael have Vista on their new laptop, but Merete's new MP3-player and the editing programme for Michael's digital camera does not work with Vista, and they cannot find a Vista-compatible driver for their scanner; in the short term, they solve their problems by using their old computer. In addition to Vista, many other problems occur. For instance, Helle and Sten experienced problems with the installation of Skype and with the setting up of the virus programme so that it did not prevent the playing of advanced games. Two of our informants belong to the group of "amateur experts" for whom it is a hobby in itself to help others with their ICT-problems. After his retirement, Brian tries to commercialize his consultancy (beyond the family) and offers to come to people's homes to repair their computers and to teach them how to use various standard programmes. Brian's market segment is retired people who usually have very basic problems. Due to his consultancy work, Brian found he had to install Vista on his new computer, but he is really annoyed with the programme and has difficulties in doing the usual things. Esben helps a large group of family and friends without any pay, except for the odd bottle of wine. His interest in computers goes back to Commodore 64, and he enjoys repairing computers, cleaning them for viruses, and trying out new equipment, programmes and internet services. One of the persons Esben helps is his 82-year old father-in-law. When he needs help, they communicate over Messenger, and if it is a bit complicated, Esben takes over the control of his father's computer over the internet by using a crossover programme. The programme is freely available on the internet, and Esben uses it when helping others as well.

Summing up, the combination of commercial innovation, public encouragement and user creativity implies widespread changes in many everyday practices, even sometimes encouraging people to engage in practices which did not interest them before (cf. the genealogy example), and these practice changes affect energy consumption. The pervasive integration of ICTs in everyday life is therefore fundamental to increasing energy consumption in several ways (here with focus on direct and indirect energy impacts – examples of derived energy impacts will be discussed later):

- When people integrate computers and internet in all sorts of doings, they increasingly want to have access to their own personal computer, not sharing it with anyone. For heavy users, like most of our informants, this has already been standard for years, and many have more than one computer per person. Several reasons are mentioned for having more than one computer: For instance, some of the informants keep their old computers with previous versions of operating systems in order to execute software that is not compatible with newer operating systems such as Microsoft Vista (cf. the example with Merete and Michael), and some informants have two or more computers dedicated different practices (like Sten, who finds it convenient to have two computers running at the same time while he plays World of Warcraft; one for World of Warcraft and Skype, and one for browsing the internet, e.g. visiting websites describing the guilds in World of Warcraft). The growing number of computers contributes to an increase in the indirect energy consumption related to the production of computers and also, if more than one computer is running at the same time, an increase in the direct energy consumption.

- Integration in many practices makes it unpractical to turn off the computer(s). While at home, many of the informants leave their computer turned on (sometimes in standby mode) and walk to and fro it several times during an ordinary evening or weekend. Most of these informants connect this with a question of convenience – for instance Norman, who explains that he and his wife are annoyed if they have to wait for the computer to start up, e.g. if they want to see the weather forecast on the internet.
- As long as the practices only call for the use of computer and internet, they may not be very energy consuming (e.g. simple communication without demand for advanced graphics), and it is, indeed, possible to be a heavy user without having a high energy consumption. But specialized equipment is increasingly offered for many practices, which also contributes to the indirect energy consumption. Some of the examples from our interviews are running computers, webcams, headsets, external hard disks and, in a certain sense, also digital cameras.
- When ICTs are integrated into so many practices, it becomes even more important to become mobile. This calls for mobile internet acces (new equipment) and results in more data traffic on the infrastructure that supports the mobile internet (sending masts etc.). In both cases, the outcome will be an increase in the indirect energy consumption.
- Finally, the integration of the internet in more and more practices involves a general increase in data transmission and bandwidth adding to indirect energy consumption for running the infrastructure.

For each single practice ICT is integrated into, the increase in direct and indirect energy consumption might seem negligible. However, like in the saying "many a little makes a mickle", the important observation is that the pervasive integration of ICT across a large number of practices involves considerable effects for the total energy use related to everyday life.

In the following, we try to develop our analysis further by studying a specific practice more detailed in order to illuminate some of the possible derived energy impacts from practice changes related to the integration of ICT. Our tentative results might inform further studies on the wider energy impacts of the pervasive integration of ICT in everyday practices.

"Stay in touch" – a practice in change?

A considerable part of the informants' use of ICT is related to communication of some kind. However, communication is, in itself, a general feature of all social interaction and mediated as well as non-mediated communication is embedded in virtually all social practices. It is therefore meaningless to identify communication – or, for that matter, social interaction – as a specific and delimited practice. Instead, we have chosen to study the practice of "staying in touch" with friends and relatives, which several of the informants identify as a meaningful cluster of activities that makes sense as an entity.

There are several reasons for choosing the practice of "staying in touch" as a case for more detailed study: First of all, the practice is important for the reproduction of meaningful relations between friends and relatives. Secondly, our interviews show that ICTs play a particular role in this practice; the changes due to the integration of ICT are therefore so profound that it makes sense to discuss the derived energy impacts. Finally, all informants have experiences with the practice, which provides us with a broad empirical material.

The practice of "staying in touch" comprises the communication between relatives and friends who do not meet on a regular and daily basis and where the focal point of the communication is an exchange of "news" about the individual life and doings of the interlocutors. This excludes the communication related to the daily practical and symbolic reproduction of the relations between close relatives, i.e. between partners or between parents and their children living at home, as well as the communication related to volunteer work, sports or similar kinds of communities of interests.

Before the "digital revolution" in personal communication at the turn of the century, the practice of "staying in touch" involved physical meetings (co-presence) and mediated communication in the form of phone calls and in some cases even letters. Today, these forms of interaction have been supplemented with – and with regard to letters and landline telephone calls to some degree displaced by – a wide range of other media and internet services like mobile phone calls and short text messages (SMS), email, instant messaging, weblogs, IP-telephony and social networking websites like Facebook and MySpace. It is important to note, that there is a great variety in the number and combination of new media that the informants employ in relation to the practice of "staying in touch"; some informants primarily use email and mobile phone, while others combine up to several internet services. Also, the informants ascribe different meanings to the media; for instance, some informants associates MSN Messenger with different threats like virus and spyware or the risk of child abuse (two of the informants have forbidden their children to use Messenger), while others enthusiastically embrace it as an "interesting and quick" (Mary) way of communicating with friends and relatives. In spite of these differences, the interviews show that for most people a number of new ICTs have been integrated into the practice of "staying in touch".

In order to illustrate how new ICTs are integrated into the "stay in touch"-practice – and how the practice is changed – we will provide a more detailed description of how the informant Grethe combines different internet services in her performance of the practice:

Grethe is 51-year old, trained as a library assistant and employed as IT consultant at the local library. She lives with her husband Rasmus, who is a bricklayer, in a detached house in a Danish provincial town. Grethe and Rasmus both have children from previous marriages: Grethe has two grown-up sons (21 and 30 year), while Rasmus has two children (13 and 15 year) who live at their mother's place and visit Grethe and Rasmus often. Grethe differs from most of the other informants as regards the large number of internet services she integrates into the practice of "staying in touch" with friends and relatives. This may partly be due to her great interest in new ICT and her playful attitude towards trying out new media and services. However, most of her examples of ICT use are comparable with the descriptions given by other informants.

The following list summarizes how Grethe integrates ICTs into the "stay in touch"-practice:

- *Email*. On a typical day, Grethe sends and receives several personal mails to/from relatives and friends. Often in order to make some kind of appointment or to get news about their personal lives and to hear how they are. She explains that emailing represents an easy way to "keep in contact" with friends and relatives in a busy everyday life. Similar examples of sending/receiving personal emails can be found in all interviews.
- *Instant messaging*. Grethe often communicates with friends and relatives through instant messaging (particularly Google Talk and the chat-feature on Facebook). When she is working at her computer – and logged in to her Google and/or Facebook account – her contacts can see that she is "online", and they often write short greetings to her. According

to Grethe, most of it is "just chit-chat" like "hi, when shall we meet again?" or "what are you doing right now?" Sometimes she log out of Google Talk and Facebook (or change her status to "offline") because she feels that the messages interrupt her in her work. Thus, the use of instant messaging can create a fragmented experience of time. Some of the other informants also use instant messaging, and their descriptions resemble Grethe's very much. For instance, Esben (a 51-year old electrician) communicates with his nephew in Australia through Messenger. The nephew also sends him pictures via Messenger, and Esben prints out the pictures and gives them to his mother (the nephew's grandmother). Esben finds it easy and cheap to use Messenger.

- *Facebook*. Grethe originally created a profile on Facebook because she was interested in visiting her niece's profile on Facebook. Later she became "friend" with her sons, and then with their friends (whom she already knew) and so on. She describes Facebook as a "paradise of teenagers" and as "pure amusement". Grethe and her "friends" write short greetings to each other. While Grethe does not use Facebook to get into contact with old friends, some of the other informants have re-activated old friendships through Facebook. One of these is the 28-year old Benny, who rediscovered several old schoolmates (from public school and high school). By reading the personal news posted on their profiles or sending/posting messages to them, he gets an idea of "how their life is today". Their reunion on Facebook has been followed up by a "reunion party". There seems to be an element of ambivalence related to the informants' experience of Facebook; they find the universe of Facebook both fascinating and captivating, but at the same time – and for the same reason – they are afraid of using too much time on Facebook. One of the informants, Gry (35-year old and writing on her master thesis in anthropology) even describes herself as "addicted" to Facebook, and she has found it necessary to set up a number of rules for her own use of Facebook. Gry has 120 "friends" on Facebook (many of these are related to her work as volunteer in a political party).
- *Web albums (digital photographs)*. At social gatherings with friends or relatives Grethe often takes pictures with her and Rasmus' digital camera. Afterwards she edits the pictures in Google's image editing programme Picasa, uploads them to a folder on Picasa's web album and invites, by email, her friends or relatives from the social gathering to visit the folder and download the pictures. Also, Grethe uses Picasa's web album to keep in contact with one of their old neighbours that moved to Singapore some time ago. She uploads photographs from social gatherings in the neighbourhood and shares them with the old neighbours so that they can follow the life on the street. Similarly, the old neighbours upload pictures from their own life in Singapore and share them with Grethe and Rasmus. In this respect Grethe differs to some degree from the other informants, as none of these integrate web albums in the practice of "staying in touch" with friends and relatives to the same extent. Grethe's story illustrates the multiplicity of internet services that can be integrated into this practice.
- *Weblogs*. Rasmus' children write about their personal life on their own blogs, and if Grethe or Rasmus have not heard from them for some time, Grethe sometimes visits their blogs to see "what they potter about with at the moment" and occasionally leaves a greeting in the form of a comment. Grethe explains that it is a way of "keeping in contact" with the children if they are too busy to stay in touch with their father and her.

These examples of the integration of ICT into the practice of "staying in touch" can be supplemented with other examples from our interview material. For instance, several informants use *IP-telephony* (Voice over IP, VoIP) regularly. One example is Benny, who talks with his parents via

Skype. Benny and his wife have given his parents a webcam in present so that they now can both hear and see each other through Skype. “It gives a really nice feeling that one can see each other”, Benny explains. Also, the 49-year old truck driver Sten frequently plays with his 26-year old son, who has moved to another part of Denmark, in the *multiplayer online role-playing game* World of Warcraft. Their characters “meet” and “fight together” in the World of Warcraft-universe and, while playing, father and son talk with each other through Skype. Their conversations are about shared experiences in the game as well as about personal matters not related to the game. Sten has also established a kind of friendships with fellow players he has never met before. World of Warcraft is their shared interest, but he also learn about their personal life through their conversations via Skype (while they play together).

On the basis of this brief introduction to our empirical results, general observations can be made about the possible changes of the practice of “staying in touch” that follows with the integration of ICT: First of all, our interview material shows that a *multiplicity of possibilities for mediated social interaction* with friends and relatives have emerged on the internet. Some of these resemble previous forms of communication to a great extent (e.g. the use of Skype as a cheap alternative to phone calls on the landline telephone), while it in other cases is less obvious to establish a line back to previous communication forms (e.g. video-telephony, instant messaging, multiplayer online role-playing games, weblogs and sharing digital photographs on the internet). Another important observation is that *mediated interaction is intertwined with non-mediated, co-present interaction*. Our interviews include only few examples of relationships based exclusively on mediated interaction (one of these exceptions is Sten, who does not meet physically with the fellow players he learn to know in World of Warcraft).

Several of the informants describe the new possibilities for internet-based interaction as a *convenient way* of staying in touch with friends and relatives in a busy everyday life. To communicate through internet services seems to be less committing than other modes of interaction such as phone conversations and – of course – physically co-presence. It is easier to finish the interaction (e.g. a conversation on Messenger) without violating traditional norms of “good behaviour” such as those related to phone conversations, and internet-based interaction rarely last for a long time. Furthermore, many internet services are based on asynchronous interaction (e.g. email, Facebook and blogs). However, some of the internet services, for instance instant messaging, seem to contribute to an experience of *time fragmentation* or are viewed as potentially *time-consuming*. Several of the informants therefore develop “strategies” to protect themselves from being interrupted by personal messages or from using too much time on e.g. Facebook.

Social networking websites such as Facebook and MySpace (but also other internet services like multiplayer online role-playing games) seem to make it *easier to establish contact to and keep in contact with a larger number of friends and acquaintances*: Old friendships can easier be re-activated (like in the case of Benny and his old schoolmates); peripheral acquaintances or friendships with persons living abroad are easier to keep alive (like in the case of Grethe and Rasmus’ old neighbours in Singapore); and new friendships can be established around a shared interest (like Sten and his fellow players on World of Warcraft or like Merete, who is looking for persons on Facebook to share dinners with). Like a rolling snowball, some of the most dedicated users of social networking services build up a larger and larger network of social relations (many of these quite peripheral).

Summing up, our interviews indicate, that the practice of "staying in touch" with friends and relatives can be in a slow transformation (partly as a result of peoples active integration of new ICTs). To some degree, mediated interaction with friends and relatives has become a continuous flow of frequently recurring interactions, where each interaction often is short-time and in many cases asynchronous. This mode of mediated interaction has similarities to what Licoppe (2004) denotes as "connected presence" in relation to the use of mobile phones (see also Christensen Forthcoming on family members' use of mobile phones). This raises the question of what kind of derived energy impacts that can be the result of these emerging changes.

Derived energy impacts of the changing practice of "staying in touch"

Before discussing the derived energy impacts, it is worth noting that our analysis of the "stay in touch"-practice supports the previous observations regarding the increasing direct and indirect energy consumption that follow from the pervasive integration of ICTs in everyday life. First, the frequent use of a multiplicity of different internet services for mediated interaction supports the trend towards individual computers that are turned on and online during most of the evenings and weekends (as well as increasing data transmission on the internet). Secondly, some internet services call for specialized equipment (e.g. Skype that necessarily depends on microphone and speakers/headphones for voice-calls and also webcams for audio-visual calls). Thirdly, in a situation where social interaction with friends and relatives is increasingly scattered over time and over a multiplicity of media, it seems likely that the demand for mobile internet access will increase. The observations that can be made with regard to the derived energy impacts are, however, rather ambiguous, and the following should therefore be regarded as tentative attempts to outline some of the possible derived impacts with regard to economic resources, time use and transport.

Most of the internet services used by the informants are free of charge (among the exceptions are SkypeOut – used for calls to ordinary phone numbers – and World of Warcraft). The integration of ICT into the practice of "staying in touch" therefore seems to result in a very limited increase in the user's expenditure – or even a decrease, if the use of the internet displaces the use of the landline telephone (as was the case for several of the informants). However, a considerable increase in expenses might be expected in relation to the diffusion of mobile internet access via mobile phones, PDAs etc, which might free fewer resources for other energy consuming activities. But as mobile internet access in itself can be expected to involve substantial indirect energy consumption in relation to the production of the required equipment as well as increasing data transmission, it is unlikely that the total energy consumption is going to decrease.

With regard to the derived impacts related to time use, the most significant change seems to be the previous mentioned increase in the fragmentation of the time experience, which calls for new strategies to handle the time fragmentation. These strategies might include the use of new services and products. For instance, Grethe sometimes uses a service called Meebo, which through simultaneous connections to multiple instant messaging-services makes it possible for her to see her MSN Messenger and Google Talk messages and contacts in the same window. To what extent these new strategies to handle time fragmentation involve increased energy consumption is, however, difficult to determine on the basis of our empirical material.

With regard to transport, our interviews do not indicate that mediated interaction "substitutes" physical co-presence or reduce the number of physical gatherings between relatives and between friends (and thus results in less transport). This is perhaps related to the understanding that this kind of relations should, above all, be based on physical interaction (co-presence) to be "real" or

"authentic". For instance, Benny feels that he to some degree has to "compromise himself" when he, via Facebook or MySpace, is contacted by people he has never met before. And if these contacts are not followed up by physical interaction (co-presence), they tend to die out after only a few instances of mediated interaction.

Rather than reducing transport, the new possibilities of establishing contact with and to stay in touch with a larger number of friends (the "rolling snowball"-effect mentioned above) might in fact implicate more transport. As one's social network is enlarged, the number of occasions to meet increases correspondingly. For instance, our empirical material includes examples of informants, who have re-established contact with old schoolmates via Facebook and, as a result of this, attended "re-union parties". Another example is Merete, who looks for new friends to share dinners with (mentioned above). A third example is Grethe and her husband Rasmus, who stay in touch with their old neighbours that has moved to Singapore. Although this contact has not yet resulted in a visit to Singapore, it is likely that the use of ICT to stay in touch with old friends living abroad increases the likelihood of following the mediated interaction up with a visit.

Concluding remarks

By having practices instead of single artefacts as the focal point of the analysis of everyday life, technology and energy consumption, it becomes possible to analyze new aspects of the complex interaction between a given practice and groups of artefacts (in our case ICTs), which are integrated into the practice and thereby contribute to changes not only in the practice itself but also in the energy consumption related to everyday life. This appears from our (tentative) study of the practice of "staying in touch" with friends and relatives, which indicates that changes in this practice have to be analyzed in relation to the complex of different ICT products and services that are integrated into the practice. These products and services contribute – separately and together – to the change of the practice itself and the changes in the direct, indirect and derived energy impacts.

In this study, our focus have been on computer and (especially) the internet, but it is obvious that also other technologies like the mobile phone and the landline telephone play an important role as material elements of the practice of "staying in touch". Likewise, also other constitutive elements of practices such as images/meanings and skills/competences should be included in further studies on how ICT is integrated into everyday practices. For instance, with regard to the practice of "staying in touch", several of our interviews indicate the existence of some kind of interplay between, on the one hand, the new possibilities of staying in touch with friends and, on the other, widespread ideas about globalization and how geographical distance should not hinder social interaction – an interplay, which might contribute to changes in the practice and perhaps result in increased transport. In a similar way, it would be interesting to study whether the images of friendship are in change and – if so – what the implications could be for the practice of "staying in touch" and the transport related to face-to-face interaction (co-presence).

As these examples illustrate, the combination of the perspectives of domestication and practice theory creates a fruitful and productive analytical approach, which raises a number of interesting research questions (although these questions are far from answered by our own tentative study).

With regard to the analytical results of our study, our interviews indicate that the pervasive integration of ICTs across a large number of practices contributes to an increase in the direct and indirect energy consumption related to everyday life. With regard to the derived energy impacts, the conclusions are more ambiguous. However, our discussion of the changes of the "stay in touch"-

practice suggests that more travelling could be a result of the new possibilities of maintaining a broader network of friends and relatives via internet services. Future studies might provide a more elaborate analysis of this.

References

Christensen, T. H. (Forthcoming) ''Connected presence' in distributed family life', Accepted for publication in *New Media & Society*.

Christensen, T. H. & Røpke, I. (Forthcoming) 'Can practice theory inspire studies of ICTs in everyday life?', in Postill, J. & Braeuchler, B. (eds.) *Theorising Media and Practice*, Berghahn, Oxford.

Licoppe, C. (2004) ''Connected' presence: the emergence of a new repertoire for managing social relationships in a changing communication technoscape', *Environment and Planning D: Society and Space* 22: 135-56.

Røpke, I. (2008) 'Theories of practice - new inspiration for ecological economic studies on consumption', in *The 10th Anniversary Conference of the Association of Heterodox Economics*.

Røpke, I., Gram-Hanssen, K., & Jensen, J. O. (Forthcoming) 'Households' ICT use in an energy perspective', in J. Gebhardt et al., (Eds.) *Experiencing Broadband Society*, Peter Lang, Berlin.

Schatzki, T. R. (2002) *The Site of the Social. A Philosophical Account of the Constitution of Social Life and Change*, The Pennsylvania State University Press, University Park, Pennsylvania.

Shove, E. & Pantzar, M. (2005) 'Consumers, producers and practices. Understanding the invention and reinvention of Nordic walking', *Journal of Consumer Culture*, vol. 5, no. 1, pp. 43-64.

Shove, E. et al. (2007) *The Design of Everyday Life*, Berg, Oxford.

Silverstone, R., Hirsch, E., & Morley, D. (1992) 'Information and communication technologies and the moral economy of the household', in R. Silverstone & E. Hirsch (eds.) *Consuming Technologies. Media and information in domestic spaces*, Routledge, London.

Silverstone, R., Morley, D., Dahlberg, A. & Livingstone, S. (1989) 'Families, technologies and consumption: the household and information and communication technologies', *CRICT Discussion Paper*, Brunel University, London.

Sørensen, K. H. (2006) 'Domestication: the enactment of technology', in T. Berker et al., (Eds.) *Domestication of Media and Technology*, Open University Press, Maidenhead, UK, pp. 40-61.

Willum, O. (2008) *Residential ICT related energy consumption which is not registered at the electric meters in the residences*, DTU Management Engineering (will become available on the internet).